

a heat state wherein a heater in said sump is maximized until fluid in said sump reaches a predetermined temperature;

a heat exchanger prime state wherein said source valve is opened to a predetermined duty cycle;

a start pump state wherein a bearing feed pump is run at a predetermined speed, and a blow motor is started; and

a run state wherein said fluid vapor distillation apparatus produces product water.

**27.** The apparatus of claim **25** further comprising:

a heat exchanger fluidly connected to said source fluid input and a product fluid output, said heat exchanger comprising:

an outer tube; and

at least one inner tube;

wherein said heat exchanger is disposed about said housing of said evaporator condenser.

**28.** The apparatus of claim **27** wherein said heat exchanger further comprising wherein said outer tube is a source fluid flow path and said at least one inner tube is a product fluid flow path.

**29.** The apparatus of claim **27** wherein said heat exchanger further comprising two ends, and at each end a connector is attached, whereby said connectors form a connection to the evaporator condenser.

**30.** The apparatus of claim **25** wherein said compressor further comprising an impeller assembly driven by a magnetic drive coupling.

**31.** The apparatus of claim **15**, wherein the controller operates the fluid vapor distillation apparatus in different states and the blowdown controller operates in a first mode during a first state and operates in a second mode during a second state.

**32.** The apparatus of claim **16**, wherein the blowdown controller operates in a proportional-derivative mode during the prime heat exchanger state and operates in a proportional mode during the run state.

**33.** The apparatus of claim **15**, wherein the blowdown controller controls to a first predetermined level in the blowdown reservoir, the source flow controller controls to a second predetermined level in the blowdown reservoir, the second level being higher than the first level.

**34.** The apparatus of claim **27**, where the blowdown controller operates in a proportional mode and the source flow controller operates in a proportional-integral-derivative mode.

**35.** The apparatus of claim **25**, wherein the vent controller varies the duty cycle of the vent valve based on the temperature signal and the operating state.

\* \* \* \* \*